

L 36088-66 EWT(m)/ENP(w)/T/ENP(t)/ETI IJP(c) JD

ACC NR: A.6016589

(A,N)

SOURCE CODE: UR/0129/66/000/005/0027/0029

AUTHORS: Lozinskiy, M. G.; Temyanko, V. G.; Natanzon, Ye. I.

46  
47

ORG: Institute of Mechanical Engineering (Institut mashinostroyeniya)

TITLE: The use of three-layered U7-30-U7 steel for automobile springs

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 5, 1966, 27-29

TOPIC TAGS: contact stress, shot peening, fatigue strength, spring steel, steel/ U7 steel, 30 steel, 50KhG spring steel

ABSTRACT: The results of a study of three-layered U7-30-U7 steel for automobile springs are given. This material was used to obtain high hardness of the spring-leaf surfaces while preserving a ductile center. The material consists of comparatively thin outer layers of U7 steel and a center layer of 30 steel. In order to obtain a spring band with a thickness of 7 mm after rolling when the thickness of the outer layers of U7 steel is 1.2 mm, the thickness of the blank of U7 steel must be 30 mm before rolling when the total thickness of the packet is 180 mm. Springs of this material are found to have a higher fatigue limit under the influence of contact stresses than 50KhG steel. The fatigue strength of the three-layered steel that has undergone shot peening is 28--30% greater than that of 50KhG steel (see Fig. 1).

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UDC: 621.135.3:621.771.8

L 36088-66

ACC NR: AP6016189

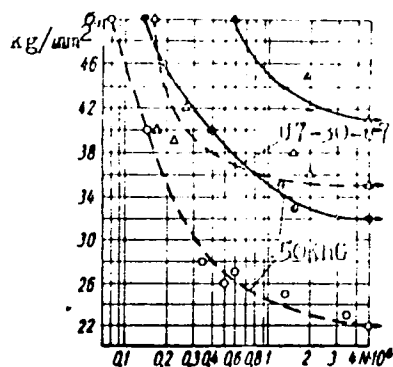


Fig. 1. Fatigue strength of three-layered 67-30-4% steel and 60KhG steel of standard composition tested under conditions of contact stresses: \_\_\_\_\_ shot peened; -----without cold working.

Orig. art. has: 2 graphs and 1 table.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 009

Bimetal

18

LS

Card 2/2

ACC NR: AP7003847

(A,N)

SOURCE CODE: UR/0122/67/000/001/0057/0059

AUTHORS: Sveshnikov, D. A. (Engineer); Natanzon, Ye. I. (Candidate of technical sciences)

ORG: none

TITLE: The possibility of replacing alloy steels with carbon steels case-hardened by heating with high-frequency current

SOURCE: Vestnik mashinostroyeniya, no. 1, 1967, 57-59

TOPIC TAGS: alloy steel, carbon steel, case hardening, electric current, metal stress, hardness, fatigue strength, durability/ 45 carbon steel, 35KhGSA alloy steel, 40KhGTR alloy steel, 40KhNM alloy steel

ABSTRACT: The results of a study involving the general laws governing the distribution of residual stresses induced during case hardening by heating with high-frequency current are presented as functions of the depth of the hardened layer and the temperature of subsequent tempering. Specimens of 45 steel with an outside diameter of 80 mm and a wall thickness of 7.0 mm (tubes) were used. The obtained results show that case hardening causes residual compressive stresses averaging  $75 \text{ kg/mm}^2$  on the surface (see Fig. 1). It was determined that subsequent tempering is not advisable in a number of cases. Case hardening was found to be an effective method for increasing residual

Card 1/2

UDC: 621.785.616:621.3.023:669.14

ACC NR: AP7003847

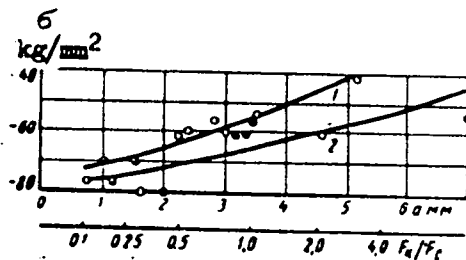


Fig. 1. Residual stresses in the surface layer of rings (at depth of 0.1 mm) versus depth of hardened layer and ratio  $F_k/F_c$ : 1 - HRC 55; 2 - HRC 45

compressive stresses which increase the fatigue strength and durability of case-hardened and tempered parts. Engineers L. D. Golubovskaya and A. I. Bad'in took part in the work. Orig. art. has: 5 graphs.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 002/ OTH REF: 002

Card 2/2

NATAPCV, B. S.

Mbr. Central Laboratory of the Plant imeni Baranov (-1945-)

Candidate of Technical Sciences

"Increasing the Workability of Alloy Case-hardened Steel, Stanki T  
Instrument, 16, No. 9, 1945

BR-52059019

НАТАПОВ, Б.С., кандидат технических наук.

Crystalline fracture in E172 steel; its nature and prevention.  
Stal' 7 no.3:245-248 '47. (MIRA 9:1)

1.Запорожский автотехнический институт.  
(Steel--Defects)

Method of Investigation of the Characteristics of Steel Fracture. (In Russian.) B. S. Natapov, Zavodskaya Laboratoriya (Factory Laboratory), v. 15, May 1949, p. 576-580.

Discusses various methods for the above. Importance of determination of the crystal structure of the fracture zone is emphasized, relationship to mechanical properties being shown by means of photomicrographs and charts.

Translation B-80363, 16 Nov 54

ASTM-SLA METALLURGICAL LITERATURE CLASSIFICATION

NATAPOV, BORIS SOLOMONOVICH

N/5  
615.918  
.N2

Termicheskaya Obrabotka Metallov (Heat Treatment of Metals, by) B. S. Solomonovich i Nikolay Arkad'yevich Blagoveshchenskiy. Moskva, Metallurgizdat, 1955.

392 p. Illus., Diagr., Tables.

Literatura: p. 391-392.

НАТАПОВ, Boris Solomonovich; ЛАКТИН, Yu.M., редактор; ГОЛИАКИНА, A.G.,  
редактор издатel'stva; БВЕРСОН, I.M., tekhnicheskiy редактор

[Metals] Metallovedenie. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry  
po cherno i svetnoi metallurgii, 1956. 343 p. (MIRA 9:12)  
(Metals)

Sov/133/58-9-20/29

AUTHORS: Natapov, B. S. and Tsivirko, D. Ye.

TITLE: The Influence of Structure and Mechanical Properties of Steel 08kp on Its Stamping Ability (Vliyaniye struktury i mekhanicheskikh svoystv stali 08kp na yeye shtampuyemost')

PERIODICAL: Stal', 1958, Nr 9, pp 828-834 (USSR)

ABSTRACT: The investigation of the above problem was carried out in order to establish the relationship between the results of testing under laboratory conditions of physico-mechanical properties and micro structure of sheet steel 08kp and its actual behaviour during the stamping process. A statistical analysis of defective stampings of parts of motorcar bodies (at the Gor'kiy Automobile Plant) due to tearing was made and correlated with properties of metal. Correlation coefficients of a number of defects during stamping with physico-mechanical properties of steel - Table 1 and Fig.1; the influence of the initial mechanical properties of steel on the number of defective stampings - Table 2, and the chemical composition of respective metal deliveries in the ladle and in sheets - Table 3; frequency of distribution of mechanical properties of the individual deliveries of sheets - Fig.2; the comparison of the proportion of defects during stamping with mechanical properties of metal - Table 4; frequency

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Sov/133/58-3-20/29

The Influence of Structure and Mechanical Properties of Steel 08kp on Its Stamping Ability

distribution of the degree of deformation for sheets of the same thickness - Fig.3. It is concluded that: 1) Under correct technological conditions of stamping parts of motor car bodies the proportion of rejects caused by faults in the metal amounted to 70-80% of the total and due to deformation 20-30% (mainly due to incorrect pressing technology). 2) One of the main causes of tearing due to faults in the metal are laminations as well as the following deviations of mechanical properties from optimum values: a) increased toughness of metal ( $\sigma_s \gg 22 \text{ kg/mm}^2$ , the ratio of  $\sigma_s/\sigma_B \geq 0.75$ ,  $R_{B100} \gg 53$ ); b) a considerable proportion of sheets with a lowered plasticity ( $\delta \leq 38$ ). 3) As the basic characteristics of the ability of 08kp steel to deep drawing the following should be considered: relative elongation, coefficient of work hardening or the ratio of  $\sigma_s/\sigma_B$  and absence of coarse laminations in zones of maximum deformations (at the size grain 6.6-7.7 and 8 and any combinations of the above sizes; round

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The Influence of Structure and Mechanical Properties of Steel 08kp  
on Its Stamping Ability

cementite inclusions of the size 1-5 are permissible).  
4) Grading of rejects on works according to tears during stamping should be carried out after an investigation of fractures in the zone of dangerous deformation and according to additional mechanical tests of sheets before stamping.  
5) Limiting permissible indices of mechanical properties for each part, difficult to stamp, should be established by a cooperative investigation of metallurgical and motor car works. 6) For the control of stability of the technological process of production of sheet steel tensile tests or according to Eriksen and hardness tests. 7) In order to improve stamping ability of sheet steel it will be advantageous to decrease the yield point (ratio of  $\sigma_S/\sigma_B$ ) to increase the relative elongation, to secure freedom from laminations

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Sov/133/58-9-20/29

The Influence of Structure and Mechanical Properties of Steel 02kp  
on Its Stamping Ability

and to increase the uniformity of sheets in a delivery.  
There are 4 tables, 3 figures and 12 references, of which  
9 are Soviet and 3 English.

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye  
Machine Building Institute)

Card 4/4

NATAPOV, B.S., dots., kand.tekhn.nauk; FAL'KEVICH, E.S., inzh.

Effect of gases on the hardness of rimmed and killed low-carbon steels. Izv.vys.ucheb.zav.; chern.met. no.11:95-98 N '58.

(MIRA 12:1)

1. Zaporozhskiy mashinostroitel'nyy institut. Rekomendovano kafedroy tekhnologii metallov i metallovedeniya.

(Steel--Metallurgy) (Gases in metals)

VALENTE, A.I.; GIL, J.M.; GIBANETSKII, V.Ye.

Effect of alloying elements on the concentration and distribution of carbon in cemented layers. Izv. vys. ucheb. zav.; metall. met. no. 10:116-12, 1964. (ZPA, 71.)

.. zapoznaem' s ob'strelitel'nyy institut.

AUTHORS: Natapov, B. S., Fal'kevich, E. S. SOV/32-24-8-32/43

TITLE: The Determination of Mechanical Properties of Steel by Testing Its Ability to Be Cupped as Indicated by Coercive Force Values (Ob opredelenii mekhanicheskikh svoystv stali dlya glubokoy vytyazhki po znacheniyam koertsitivnoy sily)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 8, pp. 1013 - 1014 (USSR)

ABSTRACT: The basic properties of the quality of cold-rolled, cupped steel plates were found to be: the flow limit, the relationship  $\frac{\sigma_s}{\sigma_B}$ , the hardness, and the results of the Eriksen test (Ref 1). The existing testing methods to determine flow limit and hardness are inadequate when applied to steel plates, so investigations were undertaken to determine whether these values could adequately be determined by the method of coercive force measurement. The method worked out by S.A.Saltykov (Ref 4) was among those used in these determinations. The experimental results obtained show that with a change of

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The Determination of Mechanical Properties of Steel by SOV/32-24-8-32/43  
Testing Its Ability to Be Cupped as Indicated by Coercive Force Values

the coercive force the changes in the flow limit  $\sigma_S$  and the hardness  $R_B$  depend on the particle size and on the grade of trimming. These relationships are expressed in the following equations:

$\sigma_S = 14 H_C - 1,5$ ;  $R_B = 20 H_C + 10$ . Students Ye.P.Ponomarenko,

V.G.Steshenko, and K.K.Milyayev participated in the work.

There are 3 figures and 4 references which are Soviet

ASSOCIATION: Zaporozh'skiy mashinostroitel'nyy institut (Zaporozh'ye Institute for Machine Construction

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18(3), 18(7)

AUTHORS:

Natapov, B. S., Vasilenko, G. I.,  
Ryabtsev, S. I., Panasenko, Ye. I.

SCV/163-59-1-43/50

TITLE:

Influence of Hot Rolling and of Recrystallization Annealing  
Upon the Structure and the Properties of Steel 08kp (Vliyaniye  
goryachey prokatki i rekristallizatsionnogo otzhiga na  
strukturu i svoystva stali 08kp)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 1,  
pp 225-229 (USSR)

ABSTRACT:

This is an investigation of some regularities encountered in  
the formation of the structure of steel 08kp during hot rolling  
and annealing. The samples were rolled in laboratory rolling  
mills and annealed in muffle furnaces. The structure was  
investigated by means of micrograph and X-ray analysis methods.  
The grain sizes were qualitatively determined on the  
texturometer by Akulov. In the plant "Zaporozhstal' " steel  
sheet has been hot rolled in order to obtain a high degree of  
stretching on a continuous rolling mill with 4 stands of  
roughing rolls and 6 stands of dressing rolls. The investigation  
showed that if the temperature after rolling still exceeds  
880° recrystallization in the billet takes place within a very

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Influence of Hot Rolling and of Recrystallization  
Annealing Upon the Structure and the Properties of  
Steel 08kp

SOV/163-59-1-43/50

short time (below 1 second). The crystallization at  $1000^{\circ}$  starts not before 16 seconds. Immediately after leaving the last stand of rolls the metal exhibited a fine grain (index 7-3) at all temperatures. Grain growth starts only after an appropriate halting time, for example at  $800^{\circ}$  growing begins after 1 minute (Ref 1). If rolling is terminated at a temperature of  $860-840^{\circ}$  and if the billet is kept for 30 minutes in a furnace at the same temperature no grain growth is found. A pronounced growth of the grains at the surface of the semifinished steel products occurs at a temperature after rolling which is below the critical point  $Ar_3$ , at a reduction of less than 15% and a subsequent halting time of 15-30 minutes at  $800-750^{\circ}$ . When rolling is carried out in the plant, a difference is observed in the growth of the grains at the metal surface. This is considered due to the different depth of deformation and a slow cooling in the range of  $800-700^{\circ}$ . In order to prevent the formation of eutectic grains the temperature at the end of rolling must exceed  $860^{\circ}$ , the reduction must keep

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Influence of Hot Rolling and of Recrystallization  
Annealing Upon the Structure and the Properties of  
Steel 08kp

SCV/163-59-1-43,50

within the limits of 12-20% and the cooling process should be accelerated in the range of 800-680°. It was further found that under otherwise equal conditions the grain size after rolling depends upon the chemical composition and the metallurgical history of the melt. The investigation showed that the duration of annealing of the steel 08kp can be reduced and the rate of cooling can be increased. One of the means of a considerable increase in output and of an improvement in steel quality may be a continuous electric annealing of the steel sheet. Laboratory investigations of resistance heating conducted in this direction yielded a satisfactory structure and quality of steel 08kp. Two temperature ranges were found to be most suitable: 730-780° and 1,000-1,050°. An annealing at 730-780° is most advantageous with respect to economy and production considerations. There are 5 figures, 2 tables, and 5 references, 4 of which are Soviet.

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye  
Card 3/4 Institute of Machine Building)

SOV/163-59-1-49/50

18(3)

AUTHORS:

Natapov, B. S., Tsivirko, D. fe., Fal'kevich, E. S.

TITLE:

Influence of Several Factors Upon the Quality of Automobile Plate  
(Vliyaniye razlichnykh faktorov na kachestvo avtomobil'nogo lista)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 1,  
pp 254-258 (USSR)

ABSTRACT:

In order to determine the deep drawing quality of 08kp VGV steel sheet the influence of the physical and mechanical properties upon the quality of the products was investigated by making a direct study of the deep drawing process for which methods of statistical analysis were applied (Refs 1,2). This statistical analysis rested on the tests of the physical and mechanical properties of 630 lots of the steel sheet in question. The experiments were carried out in the laboratory of the Gor'kovskiy avtozavod (Gor'kiy Automobile Works). This article presents the results of the statistical analysis in a table exposing the dependence of the percentage of substandard products upon the characteristics of the metal. A linear relationship was found to exist between the amount of substandard products caused by fissures in the sheet, and the physical and mechanical properties. The information collected indicates that none of these properties exercises a dominating

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Influence of Several Factors Upon the Quality of Automobile Plate

influence. A relatively insignificant interdependence between the amount of substandard products in deep drawing and the grain size of the ferrite and the inclusions containing structureless zementite was established. The low correlation coefficient is explained. The results of these investigations permit to make the statement that metallurgists should strive to produce a metal with uniform properties through one sheet and through one series and with a minimum number of cracks. As hitherto only very insufficient methods have been known of determining the yield point and the hardness the authors tried to investigate these characteristics by measuring the coercive force and thus found out that these two properties take a largely parallel course. Hence the usual measuring methods can be supplanted by a measurement of the coercive force. The mechanical properties of steel sheet can be improved by a larger grain size, by removing non-metallic inclusions, by a prevention of zementite formation and by a reduction of the sulphur content. The annealed sheets are dressed in order to improve the surface quality of automobile parts. By the specifications of the "Zaporozhstal" Works the reduction in height by dressing is set to 0.8 - 1.5 %. The investigation of the rules governing the aging of 08kp steel after deformation showed that the hardness during aging increases the

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Influence of Several Factors Upon the Quality of Automobile Plate

more, the more nitrogen is contained in the steel. An increase of the aluminum content in the steel leads to a reduction of hardness during aging. A steel which has been deoxidized by aluminum shows a tendency towards aging if it contains ample amounts of oxygen. The microscopical investigation of samples destroyed at the temperature of liquid nitrogen showed that by aging the bonds at the grain boundaries are weakened. -There are 1 table and 5 Soviet references.

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut  
(Zaporozh'ye Institute of Machine Building)

SUBMITTED: May 4, 1958

Card 3/3

TSIVIRKO, D.Ye.; NATAPOV, B.S.

Effect of the mechanical properties of sheet steel on its  
suitability for die stamping. Kuz. shtam. proizv. I no.10:1-9  
O '59. (MIRA 13:2)

(Sheet-metal work) (Steel, Automobile)

NATAPOV, B.S.; VOLOSHCHUK, M.D.; LEVCHENKO, T.V.; TSIVIRKO, D.Ye.

Dependence between the mechanical properties and the microstructure  
of 08KP steel. Trudy Zapor. mashinostroif inst. 4:45-58 '59.  
(MIRA 17:1)

NATAPOV, B.S.; TSIVIRKO, D.Ye.

Forgeability of OOKP steel depending on its initial properties.  
Trudy Zapor. mashinostroi. inst. 4:59-79 '59. (MIRA 17:1)

S/148/60/000/006/014/016/XX  
A161/A030

AUTHORS: Natapov, B.S.; Pal'kevich, E.S.

TITLE: ~~Mechanical Aging of~~ 08kn (08kp) Steel

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, 1964,  
No. 6, pp. 114 - 118

TEXT: The Zaporozh'ye Institute of Machine Construction has studied the mechanism of mechanical aging of 08kp automobile sheet steel, i.e., the change of mechanical properties with the time after dressing. The chemical composition of the samples from 14 steel consignments conformed with the standard (GOST) requirements. Dressing was produced on a laboratory mill with 1 to 25% reduction; tempering in 250°C for one hour was used after dressing. Besides this, the effect of dressing and rolling was studied in a rolling shop on two heats of rimming 08kp and two heats of semi-killed 08nc (08ps) steel of the "Zaporozhstal'" Plant. Dressing with 0.1 - 1.5% reduction produced the best effect. The intensity of mechanical aging was lower in semi-killed steel than in rimming. The difference of mechanical properties before and after rolling was not high. Slip lines appeared in the stamping of sheets reduced 0.5 - 1.0% in dressing; no slip

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Mechanical Aging of 08кп (08kp) Steel

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A161/A030

lines formed in sheets dressed with a reduction over 1%. As had been stated previously (Ref. 4), the increase of hardness in the mechanical aging of 08kp steel is connected with the nitrogen content. Oxygen and hydrogen have no such effect. It was not possible to eliminate the effect of mechanical aging fully by additions of aluminum (Ref. 5) and it is apparent that carbon caused the aging of samples deoxidized with aluminum. The mechanism of mechanical aging was studied with an 3M-3 (EM-3) electronic microscope; x-ray structure analysis by the Darwin (Ref. 6) and L.I. Lysak (Ref. 7) methods; the 2nd kind distortions were determined by Lysak's method (Ref. 7), and the 3rd type of distortions by a modified method of A. Kokhanovskaya (Ref. 8). An YPC-50 (URS-50I) apparatus was used for the x-ray analysis. Natural mechanical aging during 8 days did not change the blocks dimensions and the 2nd kind of stresses (distortions), but the 3rd kind of stresses diminished. Aging at a raised temperature increased stresses and caused the blocks to split. The electronic microscope revealed no phase changes at natural aging, but artificial mechanical aging was accompanied by a segregation of the particle on the grain boundaries and the appearance of small boils on the slip lines (Fig. 3). The boils appeared to be nitrides and carbides (their nature could not be determined). The experiment data meet the dislocation theory of the mechanical aging process. According to this theory, the first stage of the proc-

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Mechanical Aging of 08 (08kp) Steel

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A161/A030

ess consists in the migration of nitrogen and carbon atoms to dislocations, and the formation of "clouds" around the dislocations. Accumulating in spots of maximum tension stresses (below the dislocation center), they must partly release the stresses around the dislocations, and this explains the changes of 3rd kind of stresses in natural aging. The first aging stage is not connected with the separation of a second phase and with plastic deformation, and this accounts for the lacking blocks splitting and growth of the 2nd kind of stresses. Judging by the data of the papers (Refs. 10 - 12), mechanical aging at raised temperatures must end with the formation of subdispersed particles, and the observations in the present investigation confirmed this assumption. It follows that the nature of the mechanical aging may be explained with migration of nitrogen and carbon atoms to dislocations and the subsequent formation of "clouds". The "clouds" block the dislocations, and this results in an increased yield limit, tensile strength, hardness and other properties. All these properties are connected with the displacement of dislocations. The process speeds up with an increase in temperature, and subdispersed segregations appearing later in dislocations are firmly bound with the dislocations themselves. The firm bond of the nitrogen and carbon atoms with the dislocations obstructs the coagulation processes. This explains the peculiar phenomenon of restoring physical and mechanical properties at

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Mechanical Aging of 08 (08kp) Steel

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A161/A030

relatively high temperatures, basically in connection with recrystallization.  
There are 3 figures and 12 references: 6 Soviet, 2 German and 4 English.

ASSOCIATION: Zaporozhskiy mashinostroitel'-  
nyy institut (Zaporozh'ye Ma-  
chine Building Institute)

SUBMITTED: July 28, 1959

Figure 3: Electronic photo-micrograph of a specimen after 10-% deformation and subsequent tempering at 250°C for 1 h (x10,000).



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51848

S/129/62/000/000/000/000  
E193/E385

1.1710

AUTHOR: Natopov, B. S., Candidate of Technical Sciences

TITLE Heat-treatment of case-hardening steels 18X4BA (18KhNVA) and 12X2H4A (12Kh2N4A)

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov  
no. 3, 1962 50 - 59

TEXT: The theoretical basis of the present paper is provided by data reproduced in a figure which shows the temperature-time-transformation (TTT) curves for case-hardening steels 18KhNVA, 12Kh2N4A and 12X4BA (12KhNVA) (diagrams a, b and c, respectively). The continuous and broken lines relate respectively to the case and core carburized test pieces. After discussing the significance of these diagrams, the author proceeds to give recommendations regarding the optimum heat treatment procedures. It is pointed out that whereas steels used in responsible carburized components should have HTS of 95 - 115 kg/mm<sup>2</sup>, the hardened steels 12Kh2N4A, 18KhNVA and 12X4BA (12KhNVA) with a carbon content near the upper limit of Card 1/5

S/129/62/000/007/009/009  
E193/E383

Heat-treatment of . .

of the specified composition have UTS of 120 - 130 kg/mm<sup>2</sup> which, apart from reducing their impact strength makes them difficult to machine. The machineability of carburized components can be improved by application of martempering or combined quenching as the final heat-treatment. Since the stability of austenite of the carburized layer at 500 - 250 °C is higher than that of the austenite of the core it is possible to cool carburized components in the isothermal medium in such a way that the holding time is sufficiently long to convert the austenite of the core into martensite and yet short enough to prevent transformation in the carburized layer. Martempering of steel 10KhNVA at 350 - 450 °C is not recommended because treatment at these temperatures does not reduce hardness of the core owing to the high stability of austenite. The same treatment applied to steel 12KhN3A brings about a decrease in its UTS but its impact strength is also reduced (the latter effect is attributed to the formation of a heterogeneous structure containing isolated zones of ferrite and troostite or even martensite). However, martempering of steel 18KhNVA at lower temperatures

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Heat-treatment of ....

brings about both a decrease in hardness and an increase in impact strength. The recommended treatment consists of heating the component in a salt bath or an electric furnace to 800 - 830 °C, cooling it in a nitrate bath maintained at 250 °C, holding at that temperature for 10 - 15 min and quenching in oil or water. In this way, satisfactory values of hardness of both the core and the case are attained, the degree of distortion being less than that caused by the conventional treatment. When the carbon content of steel 18KhNVA is below 0.18%, satisfactory hardness (HRC 39-34) of the core of carburized components can be attained by cooling in air from 820 - 840 °C, however, it is impossible to attain hardness RC 60 in the carburized layer with this treatment. The carburized layer will have hardness RC 60 after quenching in oil but the hardness of the core (RC 41) will be too high. The core hardness in carburized components of such steels cannot be lowered by austempering and in this case martempering is recommended (fast cooling in oil or a nitrate bath in the upper range of sub-critical temperatures (650 - 500 °C) and slow cooling in the lower range (450 - 150 °C)). The

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Heat-treatment of ....

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E193/E383

remaining unaffected;

3) cooling to convert the austenite of the carburized layer to martensite.

The following schedules can be recommended. For steel

18KhNVA - heating to 820 - 840 °C, cooling to 260 - 330 °C in

air, oil or a nitrate bath, heating to 560 - 580 °C, holding

at that temperature for 1 - 3 hours and quenching in oil.

For steel 12Kh2N4A - heating to 840 - 850 °C, cooling to

260 - 230 °C in oil or a nitrate bath, heating to 500 °C,

holding at the temperature for no longer than 1 hour and

quenching in oil. The effectiveness of this treatment which

can be used for steels, whose austenite is sufficiently stable

at 450 - 600 °C, has been confirmed experimentally.

There is 1 figure.

Card 5/6

NATAPOV, B.S., kand.tekhn.nauk

Anomaly of the structure of a cemented layer. Metalloved. i term.  
obr. met. no.6:23-27 Je '62. (MIRA 15:7)

1. Zaporozhskiy mashinostroitel'nyy institut.  
(Steel--Metallography) (Case hardening)

S/126/62/013/006/016/018  
E071/E192

AUTHORS: Natapov, B.S., and Ol'shanetskiy, V.Ye.

TITLE: On the coalescence of carbide phase in normal and abnormal carbon steels

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.6, 1962, 934-936

TEXT: The velocity of coagulation of cementite grains is usually related to the velocity of diffusion of carbon. However, K.P. Bunin considered that the limiting factor in the kinetics of the coagulation process is the diffusion migration of vacancies and not the velocity of diffusion of carbon in  $\alpha$ - and  $\gamma$ -phases. In order to elucidate the influence of the velocity of diffusion of carbon on the process of coalescence of cementite, specimens of normal (08кп) (08kp) and abnormal (non-ageing steel 08Ю) (08Yu) steel possessing different coefficients of diffusion of carbon in ferrite were taken. The specimens were submitted to cementite treatment at 950 °C for 10 hours, then hardened in water from 970 °C in order to obtain martensite structure. Hardened specimens were isothermally treated at 550 °C and 700 °C for Card 1/2

NATAPOV, B.S.; BARZIIY, V.K.; OL'SHANETSKIY, V.Ye.; Prinimali uchastiye:  
FILONOV, V.A., insh.; YUDIN, M.I., insh.; IOFFE, M.M., insh.;  
POPOV, S.M., insh.; RYBALKO, G.I., insh.; ODINETS, L.I., insh.;  
SIGALKO, F.V., insh.; TSIVIRKO, D.Ye.; VOLOSHCHUK, M.D., insh.

Heat treatment of cold-rolled sheet metal. Stal' 22 no.2:163-  
165 P '62. (MIRA 15:2)

1. Zaporozhskiy mashinostroitel'nyy institut i zavod  
"Zaporozhstal'". 2. Zavod "Zaporozhstal" (for Filonov,  
Yudin, Ioffe, Popov, Rybalko, Odinese). 3. Zaporozhskiy  
mashinostroitel'nyy institut (for Sigalko, Tsvirko, Voloshchuk).  
(Sheet steel—Heat treatment)

S/133/63/000/001/010/011  
A054/A126

AUTHORS: Natapov, B. S., Soroko, L. N., Barziy, V. K., Filonov, V. A. (Deceased), Gurskiy, G. L., Ioffe, M. M., Letchford, N. I., Yudovich, S. Z.

TITLE: Improving the stamping properties of 08 Ю (08Yu) grade sheet steel

PERIODICAL: Stal', no. 1, 1963, 84 - 86

TEXT: A new technology has been developed to produce low-carbon (0.04 - 0.08%) steel suitable for cold rolling of automobile sheets having good stamping properties and which do not tend to age. From the tests (carried out in co-operation with I. A. Goncharov, G. Mikhaylov, F. A. Ksenzuk, V. G. Antipenko, M. Ye. Kugayenko, L. Dobrovol'skiy, L. I. Odinat, N. P. Cherkashina, A. K. Yaitskiy, I. N. Avramenko, M. I. Lyakhova, R. I. Razumovskaya, S. M. Popov, A. L. Khudas ("Zaporozhstal'"), N. P. Semperovich, V. Ye. Ol'shanetskiy, M. D. Voloshchuk, F. V. Sigalko (ZMI), K. M. Romanycheva, V. G. Kochevatov (GAZ)) it was concluded that the manganese content of the test grade should be lowered to 0.24 - 0.35%, while the quantity of other elements that increase the hardness

Card 1/2

S/133/63/000/001/010/011  
A054/A126

Improving the stamping properties of...

of the steel (C, N, Si, Cu, etc.) should also be kept as small as possible. The content of residual aluminum, which has a stabilizing effect, should be increased to 0.04 - 0.09% (i. e. 900 - 1,100 g/ton in the mold), the temperature at the end of rolling should be 850 - 920°C, the winding temperature after rolling 540 - 610°C, which promotes the formation of oblong ferrite grains and improves the cementite distribution. The finishing stand should be adjusted to reductions of 0.6 - 1.8%. The new steel is suitable for very deep drawing (according to ГОСТ 9045-59 (GOST 9045-59)). In the tests aluminum of a purity of 99.9% and another kind having 13% admixtures were used. However, the favourable results obtained with the 99.9% aluminum could only be approximated, but not achieved with the second grade aluminum, even when in the latter case the annealing time was extended from 8 to 12 hours. There are 1 figure and 2 tables.

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye Engineering Institute), Zavod "Zaporozhstal'" (Zaporozhstal'" Plant), and Gorkovskiy avtomobil'nyy zavod (Gorkiy Automobile Plant)

Card 2/2

E 10600-63

EMP(q)/EMT(m)/BDS AFFTC/ASD JD

ACCESSION NR: AP3001053

S/0148/63/000/004/0115/0123

56  
55

AUTHOR: Matapov, B. S.; Ol'shanetskiy, V. E.; Vasilenko, G. I.; Voleshchuk, M. D.

TITLE: The mechanism of normal and abnormal steel structure formation

SOURCE: IVUZ. Chernaya metallurgiya, no. 4, 1963, 115-123

TOPIC TAGS: abnormal steel structures, structural transformation, hypereutectoid steel, austenite, ferrite crystallization

ABSTRACT: The study was made in order to explain the formation of an abnormal structure in steels, and to what extent the surface energy influences the rate of independent or cooperative growth of different structural components. Samples of normal and abnormal steel of type 08kp with chemical composition C Si Mn P S Al, and cast at the Zaporozhstal Works, were carbonized for 10 hours in bondingizing carbonizer at a temperature of 930C. In order to observe the structural transformation in steel, the samples were heated to 900C, then submerged at certain temperatures in a salt solution (50% KCl plus 50% NaCl) and then quenched in water. After heating the hypereutectoid steel to a point above A sub cm and at subsequent isothermal delay at a little above the point A sub 1, the formation of a cementite lattice began to take place. With an extended duration, this lattice of cementite crystals remains in the normal steel. In the abnormal steel an intensive

Chp 1/2

L 10600-63

ACCESSION NR: AP3901053

coalescence of cementite takes place. In order to explain the differences between normal and abnormal steels, the isothermal transformation of austenite at different temperatures was studied by annealing and subsequent study of the microstructure of the samples. The abnormal structure in the steel is formed as a result of the preeminent separate growth of phases, assuming, that in this process the decisive factor is the ferrite crystallization rate. The formation of an abnormal structure is observed in both the normal and the abnormal steel when the austenite is supercooled to a point just below A sub 1. The tendency to form an abnormal structure in steel is greater, when the surface tension at the boundaries of ferrite-austenite and cementite-austenite is lower. Orig. art. has: 5 figures and 1 table.

ASSOCIATION: Zaporozhskiy Mashinostroitelnyy institut (Zaporozh Machine-Building Institute)

SUBMITTED: 25Apr62

DATE ACQD: 11Jan63

ENCL: 00

SUB CODE: 00

NO REF SOV: 014

OTHER: 005

Cord 2/2

NATAPOV, B.S.; OL'SHANETSKIY, V.Ye.; VASILENKO, G.I.; VOLOSHCHUK, M.E.

Effect of various factors on the tendency of steel towards anomalies. Izv. vys. ucheb. zav.; chern. met. 6 no.8:141-150 '63.  
(MIFA 16:11)

1. Zaporozhskiy mashinostroitel'nyy institut.

ALEKSEYENKO, M.F.; BANAS, P.S.; BOBKOV, T.M.; NATAPOV, B.S.; RYABTSEV, S.I.;  
SKLYAROV, P.I.; FRANTSOV, V.P.; YUDOVICH, S.Z.; PRONIN, V.Ye.

DI-1 stainless steel. Stal' 23 no.2:159-162 F '63. (MIRA 16:2)  
(Steel, Stainless)

L 36620-65 EWI(m)/EWA(d)/I/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/WB  
ACCESSION NR: AP5002347 S/0126/64/018/006/0895/0903

AUTHOR: Natapov, B. S.

TITLE: Effect of surface activity of alloying elements on the formation of secondary precipitations upon decomposition of austenite

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 6, 1964, 895-903

TOPIC TAGS: austenite, carbide crystallization, ferrite crystallization, alloying element, surface tension, alloying element solubility, grain boundary

ABSTRACT: The effect of the adsorption activity of certain alloying elements on the form of the carbide and ferrite separations along the grain boundaries of the basic phase was studied. The ratio of the surface tension of the boundaries of the different and similar phases was determined by indirect measurement of the dihedral angle of the triple junction of the grains. The value of these ratios compared with the solubilities of the alloying elements in the homogeneous phases (austenite and ferrite). Based on this, the adsorption activity of these elements was

Card 1/3

L 36620-65

ACCESSION NR: AP5002347

10  
evaluated in comparison to the austenite-austenite and ferrite-ferrite boundaries. The elements B, O, P, W, Mo, V, Ti, Al, Cu and S, which are soluble in austenite, increased the  $\sigma^{carb}/\sigma^{\alpha}$  ratio and simultaneously promoted the rupture of the carbide lattice along the austenite grain boundary, coalescence and some spheroidization of excess carbide separations at the triple junction of the grains. This confirmed the presence of the determined positive activity of these elements with respect to the austenite-austenite boundary. O, W, Mo, Ni, Mn, Cu, Ti and P, which are not significantly soluble in ferrite, increased the  $\sigma^{carb}/\sigma^{\alpha}$  ratio which led to the formation of structurally free carbide separations (partially spheroidized) on the ferrite grain boundaries. This confirmed the positive activity of these elements with respect to the ferrite-ferrite boundary. The elements Pt, Ni, Mn, and to a lesser extent Cr, are negatively active with respect to the austenite boundaries since they have greater solubility in the  $\gamma$ -phase and decrease the  $\sigma^{carb}/\sigma^{\alpha}$  ratio. Si, V, Al and Cr, which are readily soluble in the  $\gamma$  phase and decrease the  $\sigma^{carb}/\sigma^{\alpha}$  ratio are negative with respect to the ferrite boundaries. Negative adsorbents protect or form continuous carbide separations on the austenite-austenite and ferrite-ferrite boundaries. Orig. art. has: 3 equations and 3 tables

Cord 2/3

L 36620-65

ACCESSION NR: AP5002347

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut im. V. Ya. Chubarya  
(Zaporozh Machine Construction Institute)

SUBMITTED: 22Jan64

ENCL: 00

SUB CODE: MM

NR REF SOV: 020

OTHER: 008

Card 3/3

L 11379-65 EWT(m)/EWP(w)/EWP(c)/EWP(b) ASU(m) MJN/JE/JT  
 S/0133/64/000/007/0642/0645  
 ACCESSION NR: AP4041870  
 AUTHOR: Alekseyenko, M. F., Vasilenko, G. I., Natupov, B. S., Orekhov, G. N.,  
Pridantsev, M. V., Frantsov, V. P.  
 TITLE: Case-hardening and heat-treatable steels DI-2, DI-3, DI-3A (EP170) and DI-4  
 SOURCE: Stal', no. 7, 1964, 642-645  
 TOPIC TAGS: steel, case hardening steel, heat treatable steel, PI steel, low nickel steel,  
 hardening temperature, tempering, steel mechanical property  
 ABSTRACT: The authors developed a group of low-nickel case-hardening steels which,  
 in terms of their physical and mechanical properties, are comparable to the high-nickel  
 steel currently used for high-stress pieces in the machine-building industry and which  
 possess optimal properties of the case-hardened layer in finished items. The low-nickel  
 steels DI-2 (18KhGSN2MVA) and DI-4 (18KhGSN2MA) were developed to replace steels  
18Kh2N4VA and 20Kh2N4VA, while steel DI-3A or EP170 was designed to replace steels  
12KhN3A and 12Kh2N4A. The abbreviation "DI" used in connection with these newly-  
 developed types stands for "dneprospetsstal'skaya issledovatel'skaya" or "Dneprospetsstal"

Card 1/4

L 11379-65

ACCESSION NR: AP4041870

Experimental". The expenditure of nickel for the new steels averages 20 - 25 kg/ton less than for the old. Steel DI-3, which does not contain molybdenum, is recommended exclusively as a replacement for type 12KhN3A steel. The molybdenum in DI-3 steel may be completely or partially substituted by tungsten in the ratio Mo : W = 1 : 3. In the development of the new types, provision was made to use the chromium-nickel-molybdenum steel scraps available in large quantities throughout the country. Particular attention was directed at the proper proportions of elements which promote and impede case-hardening. For this purpose on specially smelted low-carbon alloys, a study was made of the mutual effect of the basic alloying elements (Cr, Mn, Si, Ni, W, Mo, V) on the carbon concentration in the layer. It was discovered that the greatest effect is exerted by chromium and silicon. The permissible limits (upper and lower) of the content of the basic elements in the new steels are shown in a table. No more than 0.06% vanadium and no more than 0.03% sulfur and phosphorus is permitted in the new steels. The physical and mechanical properties of the steels were thoroughly tested. When the effect of the hardening temperature in the 800 - 950C range on the mechanical properties of the steels was tested, both DI-2 and DI-3 showed high strength and plasticity, with an optimal hardening temperature at 820 - 860C. The effect of the

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L 11379-65

ACCESSION NR: AP4041870

tempering temperature on the mechanical properties of type DI-2 steel was also studied and high tempering was recommended in an interval of 530 - 600C. It was further recommended that steel DI-2 be used for air hardening in a disk to 80 mm, and with oil hardening to 150 - 200 mm. Steel DI-3A and DI-4A are recommended for sections to 80 mm, and steel DI-3 - to 40 mm. The effect of long-term high-temperature heating on the new types was found to be negligible. These steels are distinguished by fine grain, the size of which, on heating to 1,000C, remains within 7-8 units. In terms of resilience (impact ductility), the new steels are comparable to high-alloy steels and retain rather good impact toughness even at a temperature of -196C. The article indicates that the new steels are highly resistant to notching (incising). For case-hardened items which operate under conditions of variable loads, an important characteristic is the endurance limit, which for these new economical steels is equal to that of high-nickel steels. A layer-by-layer chemical analysis showed that the carbon saturation of the case-hardened layer and its depth are the same in the new steels as in the high-alloy steels, but that the content of residual austenite is smaller. A further advantage of the new steels is the higher weakening temperature during tempering, which makes it possible to recommend them for items designed to function at temperatures up to 250 - 300C. The new low-cost steels also lend themselves well to nitriding. "V. Ye. Pronin, G. Kh. Gakuyev, Yu. P. Shamil", T. M. Babkov.

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L 11379-65

ACCESSION NH: AP4041870

L. I. Yefremova, I. P. Banas, M. S. Kunin, G. V. Kulygin, Ye. I. Bushmanova,  
L. G. Kozyreva, S. Z. Yudovich, P. I. Sklyarov, D. D. Tishchenko, V. M. Doronin  
and T. V. Levchenko also took part in the work." Orig. art. has: 1 table.

ASSOCIATION: none

SUBMITTED: 00

DATE SEL: 30Jul64

ENCL: 00

SUB CODE: MM

NO REF SOV: 002

OTHER: 000

Card 4/4

L 31128-65 EWT(m)/EWA(d)/EWP(t)/EWP(b) Pad IJP(c) JD/HW/JG

ACCESSION NR: AP5002940

S/0129/65/000/001/0012/0015

AUTHOR: Natapov, B.S.; Ol'shaneskiy, V. Ye.; Ponomarenko, Ye. P.

TITLE: Influence of the alloying elements on the shape of secondary formations in nickel-based heat resistant alloys /6

SOURCE: Metallovedeniye i tekhnicheskaya obrabotka metallov, no. 1, 1965, 12-15

TOPIC TAGS: nickel alloy, secondary formation, heat resistant alloy, excessive phase, matrix grain, alloy additive, alloying element, alloy mechanical property

ABSTRACT: To improve the mechanical properties and resistance of heat resistant alloys, it is important to consider the formation of excess phase at the matrix grain boundary. The different shapes of these formations (thin films, continuous or interrupted network, spheroidal coagulations), as well as the abutment angles (two-face angle  $\theta$ ) of three neighboring particles and the accumulation of free boundary energy are discussed. The purpose of the present work was to determine the role of some alloying elements in the formation of intergrain boundaries. For this purpose these elements were introduced into a heat resistant alloy of the following composition: 0.15-0.20% C, 15-20% Fe, 14-16% Cr, 2.8-3.5% Mo, 2.9-3.5% W, the balance being Ni. The additives consisted of Ti, Al, B, Nb, Zr and mixed metals (Ce+Nd+Pr). The influence of each of these additives is

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\*[Misch metal]

L 31128-65

ACCESSION NR: AP5002940

discussed in detail. The conclusion is that the introduction into a refractory nickel alloy of small quantities of B, Zr and mixed metal results in such a distribution of the excess phase in small spheroidal particles that it enhances the strength of intercrystalline areas of the alloy, thereby improving the operational reliability of the product. Orig. art. has: 1 figure, 3 formulas, and 2 tables.

ASSOCIATION: Zaporozhsky mashinostroitel'nyy institut (Zaporozh'ye machine-building institute)

SUBMITTED: 00

ENCL: 00

SUB CODE: MM

NO REF SOV: 008

OTHER: 003

Card 2/2

NATAPOV, B.S.; VASILENKO, G.I.; OL'SHANETSKIY, V.Ye.

Character of carbide phase distribution in the carburized layer  
of alloy steels. Izv. vys. ucheb. zav.; Chern. met. 8 no.2:134-141  
'65. (MIRA 18:2)

1. Zaporozhskiy mashinostroitel'nyy institut.

OL'SHANETSKIY, V.Ye.; NATAPOV, B.S.

Evaluating the amount of anomalous structure in steels. Izv.  
vys. ucheb. zav.; Chern. met. 8 no.9:158-162 '65. (MIRA 18:9)

1. Zaporozhskiy mashinostroitel'nyy institut.

L 29383-66 EWT(m)/EWP(t)/ETI IJP(c) JD/HW/WB

ACC NR: AP6016586

(N)

SOURCE CODE: UR/0129/66/000/005/0020/0022

AUTHOR: Gayduk, V. V.; Koval', A. D.; Natapov, B. S.

ORG: Zaporozh Machine-Building Institute (Zaporozhskiy mashinostroitel'-nyy institut)

TITLE: The structure and properties of heat-resistant ZhS-type nickel alloy on cooling

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 5, 1966, 20-22 and insert facing p. 33

TOPIC TAGS: nickel alloy, heat resistant alloy, alloy heat treatment, alloy rupture life, alloy structure, chromium containing alloy, tungsten containing alloy, molybdenum containing alloy, aluminum containing alloy, titanium containing alloy

ABSTRACT: The effect of annealing temperature on the structure and properties of ZhS-type nickel-base alloy (0.1%C, 16.2%Cu, 4.9%W, 4.4%Mo, 4%Fe, 2.9%Al, 2.4%Ti, 0.4%Si, 0.5%Mn, 0.02%B, 0.015%Ce) has been investigated. The alloy specimens were annealed at 1000-1300C for 4 hr and air cooled. It was found that with increasing annealing temperature, the notch toughness and the rupture life increase and reach a maximum with annealing at 1200C. The rupture life at 950C under a stress of

Card 1/2

UDC: 620.18:669.14.018.45

L 29383-66

ACC NR: AP6016586

12.5 kg/mm<sup>2</sup> was found to be 160 hr and the room temperature notch toughness, 6.5 mkg/cm<sup>2</sup>. The most stable structure and best combination of properties were achieved by annealing at 1200C followed by aging. The danger of oxidation makes it necessary, however, to use greater machining allowances: not less than 0.3 mm. At smaller allowances the annealing has to be performed in a protective atmosphere, in a salt bath, or at lower temperature. Orig. art. has: 3 figures. [WW]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 006/ ATD PRESS: 5008

Card 2/2 CC

BITERMAN, I.M.; KUTEYNIKOV, Ye.S.; LEONOV, B.N.; MATAPOV, L.M.

Lower Carboniferous sediments in the Kyuytingdinskiy trough of the  
northeastern Siberian Platform. *Biul.MDIP.Otd.geol.* 36 no.6:96  
M-D '61. (MIRA 15:7)  
(Olenek Valley—Geology, Stratigraphic)

KUTEYNIKOV, Ye.S.; NATAPOV, L.M.

New data on the tectonics of the northeastern margin of the Siberian Platform. *Biul.MOIP.Otd.geol.* 36 no.6:96-97 N-D '61.

(MIRA 15:7)

(Siberian Platform—Geology, Stratigraphic)

NATAPOV, L.M.

Sediments of the Domanik-type formation in the northeastern  
part of the Siberian Platform. Sov.geol. 5 no.11:110-112  
N '62. (MIRA 15:12)  
(Siberian Platform--Sediments (Geology))  
(Organic matter)

KUTEYNIKOV, Ye.S.; NATAPOV, L.M.

Tectonic pattern of the extreme northeastern part of the Siberian  
Platform. Trudy VAGT no.8:66-72 '62. (MIRA 15:11)  
(Siberian Platform—Geology, Structural)

KUTEYNIKOV, Ye.S.; NATAPOV, L.M.

Clastic dikes in the sediments of the Sinian complex in the Olenek  
Valley. Trudy VAGT no.8:78-79 '62. (MIRA 15:11)  
(Olenek Valley--Dikes (Geology))

KUTEYNIKOV, Ye.S.; NATAPOV, L.M.

Interpretation of fracture traces on black-and-white aerial photographs as revealed by the studies of the northeastern margin of the Paleozoic area in the Siberian Platform. Trudy VAGT no.8: 130-136 '62. (MIRA 15:11)

(Siberian Platform--Faults (Geology))  
(Siberian Platform--Aerial photogrammetry)

BITERMAN, I.M.; KUTEYNIKOV, Ye.S.; LEONOV, B.N.; NATAPOV, L.M. .

New data on the lower Carboniferous deposits of the northeastern  
part of the Siberian Platform. Dokl.AN SSSR 144 no.3:613-616  
My '62. (MIRA 15:5)

1. Vsesoyuznyy aerogeologicheskiy trest. Predstavleno akademikom  
A.L.Yanshinym.  
(Siberian Platform--Geology, Stratigraphic)

KUTEYNIKOV, Ye.S.; NATAPOV, L.M.

New data on the tectonics of the northeastern edge of the Siberian Platform. Dokl. AN SSSR 149 no.6:1405-1408 Ap '63. (MIRA 16:7)

1. Vsesoyuznyy aerologicheskiy trest. Predstavleno akademikom D.I.Shcherbakovym.

(Siberian Platform--Geology, Structural)

LEONOV, B.N.; BITERMAN, I.M.; NATALOV, I.M.

Characteristics of the tectonic development of the Olenek highland  
in the Late Pre-Cambrian. Dokl. AN SSSR 161 no.5:1173-1176 Ap '65.  
(MIRA 18'5)

1. Submitted February 15, 1964.

ACC NR: AP6034490

SOURCE CODE: UR/0210/66/000/006/0050/0059

AUTHOR: Zonenshayn, L. P.; Natapov, L. M.; Uflyand, A.K.

ORG: All-Union Aerogeological Trust, <sup>Moscow</sup> (Vsesoyuzhnyy aerogeologicheskii trust)

TITLE: Structure of the Aldan branch of the Priverkhoyansk foredeep

SOURCE: Geologiya i geofizika, no. 6, 1966, 50-59

TOPIC TAGS: geologic exploration, anticline, geologic survey, ~~foredeep~~, foredeep, ~~structural geology~~ *tectonics*

ABSTRACT: The structure of the Aldan branch of the Priverkhoyansk foredeep is described. Steep flexures alternating with gently sloping echelon brachysynclines characterize the boundary region between the Verkhoyansk folded region and the Priverkhoyansk foredeep. The limiting folds are oriented at a steep angle to the foredeep strike, plunging east-southeast. These folds can be traced within the inner zone of the foredeep. A system of narrow anticlines, separated by broad synclines is also found in the inner zone of the foredeep. The entire Verkhoyansk complex consists of Permian-Cretaceous formations. The outer zone of the foredeep is composed of Jurassic and Cretaceous formations superposed on a Lower Paleozoic basement. The inner and

Card 1/2

UDC: 653.98:651.70+551.24(571.56)

ACC NR: AP6034490

outer zones are separated by a marginal suture-type deep-seated fault.  
Orig. art. has: 1 figure

SUB CODE: 08/ SUBM DATE: 23Apr64/ ORIG REF: 012/ OTH REF: 006

Card 2/2

PARUSNIKOV, V.N., NATALOVA, R.I.; MALIKOVA, L.P.

Cleaning of hot-drawn tantalum wire from graphite lubrication.  
TSvet. met. 36 no.10:73-76 0 '63. (MIRA 16:12)

ACCESSION NR: AP4011290

S/0136/64/000/001/0066/0069

AUTHOR: Natapova, R. I. ; Kirsanova, T. A. ; Malikova, L. P. ; Sokolov, Yu. A. ; Parusnikov, V. N.

TITLE: Cold drawing of tantalum wire

SOURCE: Tsvetny\*ye metally\*, no. 1, 1964, 66-69

TOPIC TAGS: tantalum wire, tantalum wire drawing, tantalum copper plating, cold drawing, wire drawing, copper plated tantalum wire

ABSTRACT: A method for smooth drawing of tantalum wires (Authors certificate Nr. 148373) was devised to eliminate wire rupture and gas absorption by the metallic wires which cause the wire to possess poor mechanical properties. Since the use of ordinary lubricants and oxidizing of the metal surface does not eliminate these difficulties, it is proposed that the tantalum material after cleaning be copper plated by hot dipping in an inner atmosphere. Hot-drawn wire was cleaned of aquadag and oxides by electrolytic etching. Hot copper plating of

Card 1/2

ACCESSION NR: AP4011290

the cleaned wire was done in argon by drawing the wire through a graphite crucible with molten copper. Rate of drawing and temperature must be strictly controlled for uniform coating. The latter is uniformly deformed during cold drawing and does not peel off. Cold drawing of 100-200 micron diam. wire (coating 1-2 microns) to a maximum size of 40-60 micron diam. can be achieved. For drawing to finer wires electrolytic copper plating should be superimposed thereon (100-200 micron diam primary wire 10-20 micron diam final wire, 3-5 micron coating achieved in two passages at a rate of 1.5-2 m/min, 20sec. in the bath, 20 amp/sq.in. current density). Electrolytic coating should be applied over etched hot coating for better uniformity and smoother drawing of small gauge wires. After drawing, coating should be electrolytically or chemically removed. Thus, perfect cold drawing of finest gauges becomes possible due to copper plating. Rate of drawing ranges from 20-15 m/min for 30-250 micron diam to 8-2 m/min- for 10-30 micron diam. Orig. art has: 3 figures.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 14Feb64

ENCL: 00

SUB CODE: EL

NO REF SOV: 005

OTHER: 002

Card 2/2

L 13607-66 EWT(m)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) JD/HM

ACC NR: AP6002870

SOURCE CODE: UR/0286/65/000/024/0032/0032

INVENTOR: Danilina, O. B.; Fomin, A. P.; Natapov, S. L.; Romodina, L. I.; Yermolovich, L. F.

ORG: none

TITLE: Method of heat treatment of austenitic-ferritic steel welds.  
Class 18, No. 176945. 4 373  
785.18

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 24, 1965, 32

TOPIC TAGS: weld, heat treatment, weld heat treatment, steel, steel weld, austenitic ferritic steel

(ABSTRACT: This Author Certificate introduces a method of annealing age-hardenable austenitic-ferritic steel welds strengthened by aging. To obtain welded joints with a ductility and strength equal to those of the parent metal, the weldments are annealed prior to aging at a temperature which ensures an optimal ferrite-to-austenite ratio (about 1:1) and water quenched or air cooled. [ND]

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:621.785.78

Cord 1/1

KONONENKO, G.I., inzh.; NATARIUS, N.A., inzh.

Loading and unloading equipment and conveying machinery made  
in England. Mekh.i avtom.proizv. 15 no.11:56-61 N '61.

(MIRA 14:11)

(Great Britain—Loading and unloading—Equipment and supplies)

(Great Britain—Conveying machinery)

(Moscow—Exhibitions)

ABDULIN, A.; ALEKSEYEV, I.; BANTLE, O.; BOBROV, L.; BOZHANOV, B.;  
 BOYKO, V.; BONDAREV, K.; BORZOV, V.; VERKHOVSKIY, N.; GUBAREV, V.;  
 GUSHCHEV, S.; DEBABOV, V.; DIKS, R.; DMITRIYEV, A.; ZHIGAREV, A.;  
 ZEL'DOVICH, Ya.; ZUBKOV, B.; IRININ, A.; IORDANSKIY, A.;  
 KITAYGORODSKIY, P.; KLYUYEV, Ye.; KLYACHKO, V.; KOVALEVSKIY, V.;  
 KNORRE, Ye.; KONSTANTINOVSKIY, M.; LADIN, V.; LITVIN-SEDOY, M.;  
 MALEVANCHIK, B.; MANICHEV, G.; MEDVEDEV, Yu.; MEL'NIKOV, I.;  
 MUSLIN, Ye.; NATARIUS, Ya.; NEYFAKH, A.; NIKOLAYEV, G.; NOVOMEYSKIY, A.;  
 OL'SHANSKIY, N.; OS'MIN, S.; PODOL'NIY, R.; RAKHMANOV, N.; REPIN, L.;  
 RESHETOV, Yu.; RYBCHINSKIY, Yu.; SVOREN', R.; SIFOROV, V.; SOKOL'SKIY, A.;  
 SPITSYN, V.; TEREKHOV, V.; TEPILOV, L.; KHAR'KOVSKIY, A.; CHERNYAYEV, I.;  
 SHAROL', L.; SHIBANOV, A.; SHIBNEV, V.; SHUYKIN, N.; SHCHUKIN, O.;  
 EL'SHANSKIY, I.; YUR'YEV, A.; IVANOV, N.; LIVANOV, A.; FEDCHENKO, V.;  
 DANIN, D., red.

[Eureka] Evrika. Moskva, Molodaya gvardiya, 1964. 278 p.  
 (MIRA 1843)

NATARIUS, YA I.

AUTHOR: Natarius, Ya.I., Engineer

98-7-16/20

TITLE: Research Work in the Field of Concrete (Issledovatel'skiye raboty v oblasti betona)

PERIODICAL: Gidrotekhnicheskoye Stroitel'stvo, 1957, No 7, pp 52-53 (USSR)

ABSTRACT: Extensive research work was conducted at the Glockner-Kaprun construction project regarding water permeability and frost resistance of concrete. It was found that frost resistance increased when dust particles were removed from the filling materials. The applied cycles of freezing and thawing varied from 8 to 12, and 16 hours (the thawing period being 4 hours) at temperature readings of from -20 to +15° C. Tests were conducted with samples of varying granular structures of the filling materials, and with 270 kg of cement per cu m of concrete. The percentage of cement had little influence on the resistance to freezing, whereas the quality of the cement influenced the degree of frost resistance. The selection of plasticizers is determined by the necessity to reduce the water content of the mixture. Frost resistance of concrete is also increased when fine sand is not used in the event of the application of plasticizing additives with air attracting properties.

Card 1/2

Research Work in the Field of Concrete

98-7-16/20

As a result of the conducted tests, concrete with a percentage of 125 kg of cement per cu m of concrete was obtained, suitable for massive structures, whereas concrete with a content of 250 kg/cu m may be considered to be satisfactorily frost resistant as surface sections of concrete spill-dams. Concrete mixtures with contents of 225 kg/cu m showed satisfactory resistance to permeability at pressures from 1.5 to 10 atmospheres exerted during 24 hours, and 15 atmospheres during 7 days. The removal of dust from the sand was accomplished with the hydraulic classifier "Reaks". This article contains 1 figure, 2 tables, 4 diagrams, and 3 references, 2 of which are in English and one in German.

AVAILABLE: Library of Congress

Card 2/2

AUTHOR: Natarius, Ya.L., Engineer SOV-98-58-9-18/21  
TITLE: The Glen Canyon Hydro-Electric Installations on the Colorado River (Gidrouzel Glen Ken'on na r.Kolorado)  
PERIODICAL: Gidrotekhnicheskoye stroitel'stvo, 1958, Nr 9, pp 50 - 52 (USSR)  
ABSTRACT: The main characteristics of hydroelectric installations in Glen Canyon on the Colorado river are given. There are 3 diagrams and 3 references, one of which is Soviet and 2 American.

**1. Hydroelectric power systems**

Card 1/1

NATARIUS, Ya.I., inzh.

Salime(Spain) Hydroelectric Power Station. Gidr.stroi. 27 no.3:53-55  
Mr '58. (MIRA 11:4)

(Salime hydroelectric power station)

NATARIUS, Ya.I., inzh.

Glen Canyon hydroelectric project on the Colorado River. Gidr.stroi.  
27 no.9:50-52 S '58. (MIRA 11:11)  
(Colorado River--Power utilization)

15(6)

AUTHOR: Natarius, Ya.I., Engineer

SOV/98-59-3-14/17

TITLE: The Utilization of Gamma Radiography for the Examination of Concrete (Primeneniye gamma-radiografii pri issledovanii betona)

PERIODICAL: Gidrotekhnicheskoye stroitel'stvo, 1959, Nr 3, pp 55-57 (USSR)

ABSTRACT: The author describes a method of controlling the quality of reinforced concrete parts by utilizing gamma rays. This method, used abroad, is described from foreign sources. There are 3 references, 1 of which is English, 1 Indian and 1 Soviet.

Card 1/1

SOV/98-59-8-15/33

10(0)

**AUTHOR:** Natarius, Ya.I., Engineer

**TITLE:** The Organization of Scientific Research Work in the Field of Hydraulics in Australia

**PERIODICAL:** Gidrotekhnicheskoye stroitel'stvo, 1959, Nr 8, pp 52-53 (USSR)

**ABSTRACT:** The article is a discussion of the work carried out by the Special Board for the Exploitation of the Water Resources of the Snowy Mountains, within the limits of which flow 3 of the largest rivers of the Australian continent, the Snowy, Murray and Hume. There is 1 Australian reference.

Card 1/1

NATARIUS, Ya.I., inzh.

Using the method of gamma-radiography in testing concrete. Gidr.  
stroil. 28 no.3:55-56 Mr '59. (MIRA 12:4)  
(Concrete--Testing)  
(Radioisotopes--Industrial applications)

NATARIUS, Ya.I., inzh.

Construction and operation of fishways. Gidr. stroi. 33 no.11:  
50-52 II '62. (MIRA 16:1)

(Fishways)

MALEVANCHIK, B., inzh.; NATARIUS, Ya., inzh.

Along fish highways. Znan.-sila 37 no.10:38-40 0 '62.  
(MIRA 16:1)

(Fishways)

BUMSHTEYN, S.I.; NATAROV, A.I.; MIKHAYLOV, K.I., red.

[Manual for the driver of the second class; construction, maintenance and operation of motor vehicles] Uchebnoe posobie shofera vtorogo klassa; ustroistvo, tekhnicheskoe obsluzhivanie i ekspluatatsiya avtomobilei. Moskva, DOSAAF, 1965. 495 p. (MIRA 18:5)

NATARCH, Boris Fedorovich; CHEKHOVIY, M., veduchiy redaktor; PATSALYUK,  
P., tekhnicheskiiy redaktor

[Wide-screen motion pictures] Shyrokoekranne kino. Kyiv,  
Derzh. vyd-vo tekhn. lit-ry URSR, 1956. 36 p. (MLRA 10:5)  
(Motion-picture projection)

MATAROV, B.F., kand.tekhn.nauk. dots.

Three-dimensional motion pictures. Nauka i zhyttia 8 no.5:  
14-17 My '58. (MIRA 13:4)  
(Motion pictures, Three-dimensional)

NATAROV, B.F.

Quality of stereophonic sound in motion-picture theaters. *Tekhn.*  
kino i telev. 4 no.6:45-48 Je '60. (MIRA 13:7)

1. Kiyevskiy politekhnicheskii institut.  
(Stereophonic sound systems)  
(Motion-picture theaters)

NATAROV, B.F.

Number of channels in a stereophonic sound reproducing system in wide-screen motion-picture theaters. Tekh.kino i telev. 4 no.7: 49-51 J1 '60. (MIRA 13:7)

1. Kiyevskiy politekhnicheskii institut.  
(Motion-picture theaters)  
(Stereophonic sound systems)

ACC NR: AT6034455

(N)

SOURCE CODE: UR/0000/66/000/000/0194/0200

AUTHOR: Ol'shanetskiy, V. Ye.; Matarov, B. S.

ORG: none

TITLE: Effect of the absorptive activity of alloying elements on the nature of the distribution of excess phases along the grain boundaries of nickel base alloys

SOURCE: AN SSSR. Institut metallurgii. Svoystva i primeneniye zharoprochnykh splavov (Properties and application of heat resistant alloys). Moscow, Izd-vo Nauka, 1966, 194-200

TOPIC TAGS: nickel base alloy, phase diagram, metal grain structure

ABSTRACT: The relative change in free energy in the transition from like grain boundaries to unlike grain boundaries is determined by the expression

$$\frac{\sigma''}{\sigma'''} = \frac{1}{2 \cos \frac{\beta''}{2}}, \quad (1)$$

where  $\beta''$  is the dihedral angle in the triple junction of two grains of the matrix and a grain of the excess phase. Then, for segregated phases with a lattice character, the following inequalities are valid

$$0 < \beta'' < 60^\circ \text{ and } \frac{1}{2} < \frac{\sigma''}{\sigma'''} < \frac{1}{\sqrt{3}},$$

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ACC NR: AT6034455

and for segregated phases of spherical form

$$\beta'' > 60^\circ \text{ and } \frac{\sigma''}{\sigma''} > \frac{1}{\sqrt{3}}.$$

To clarify the role of certain alloying elements in the change in the energy state of the grain boundaries in heat resistant nickel base alloys, these elements were introduced into an alloy with the following initial chemical composition: 0.15-0.20% carbon; 15-20% iron; 14-16% chromium; 2.8-3.5 molybdenum; 2.9-3.5% tungsten; remainder nickel. The following alloying elements were investigated: Co, Pr, Nd, B, Zr, Al, Nb, and Ti. The effect of the added elements is shown in tabular form and by microphotographs of the alloys. In general, it is concluded that introduction into heat resistant nickel base alloys of small amounts of alloying elements, including boron and zirconium, brings about a favorable form of distribution of the excess phases, which should promote strengthening of the intergrain boundaries in these alloys. Orig. art. has: 5 formulas, 1 figure and 1 table.

SUB CODE: 11/ SUBM DATE: 10 Jun 66/ ORIG REF: 012/ OTH REF: 005

Card 2/2

NATAROV, V.D., kand.geologo-mineralogicheskikh nauk

Determination of expected water inflow to underground mines of  
the Saksagan region in the Krivoy Rog Basin. Sbor. nauch. trud.  
NIGRI no.2:44-61 '59. (MIRA 14:1)  
(Krivoy Rog Basin—Mine water)  
(Saksagan Valley—Iron mines and mining)

NATAROV, V.D.; KAZAK, V.M.

Method of determining interstitial water resources in the Krivoy  
Rog Basin. Sbor. nauch. trud. NIGRI no.2:62-79 '59. (MIRA 14:1)  
(Krivoy Rog Basin—Water, Underground)

NATAROV, V.D.; BETIN, D.I.

Method of determining anticipated inflows into mine openings and open pits with a calculation of drainage time under conditions of the Krivoy Rog Basin. Sbor. nauch. trud. NIGRI no.7:60-69 '60. (MIRA 14:12)

(Krivoy Rog Basin--Mine drainage)  
(Water, Underground)

NATAROV, V.D.; NATAROV, V.V.

Mine waters in the Krivoy Rog Basin and possibilities of their  
utilization for balneological purposes. Geol. zhur. 20 no. 4:79-  
83 '60. (MIRA 14:4)

(Krivoy Rog Basin—Mine water)

NATAROV, V.D.

Main features in the history of river valley formation in the  
Krivoy Rog Basin. Geog. zbir. no.4:65-69 '61.

(MIRA 14:8)

(Krivoy Rog Basin-- Valleys)

NATAROV, V.D.

Karsts and karst waters in Pre-Cambrian rocks in the Saksgan'  
region of the Krivoy Rog Basin. Sov.geol. 4 no.9:143-148 S '61.  
(MIRA 14:11)

1. Krivorozhskiy nauchno-issledovatel'skiy gornorudnyy institut.  
(Krivoy Rog Basin--Karst)

NATAROV, V.D.; MALAKHOV, N.L.

Manganese ores in the Krivoy Rog Basin. Razved. i okh. nedr. 27 no. 3:  
4-6 Mr '61. (MIRA 14:5)

1. Nauchno-issledovatel'skiy gornorudnyy institut (for Natarov).
2. Rudnik Ingulets, Krivorozhskiy shelezorudnyy basseyn (for Malakhov).  
(Krivoy Rog Basin—Manganese ores)

NATAROV, V.D.

Role of underground waters in the formation of high-grade  
iron ores in the Krivoy Rog iron-ore basin. Geol. zhur. 23  
no.2:53-58 '63. (MIRA 16:6)

1. Krivorozhskiy nauchno-issledovatel'skiy gornorudnyy  
institut.

(Krivoy Rog---Water, Underground)

(Krivoy Rog---Iron ores)

BRYZGALOVA, Ye.V., kand.ekon.nauk; NATAROV, V.F., inzh.-ekonomist

Effect of the utilization of waste and by-products on the  
economy of the shales-gas industry. Trudy LEBI no.25:84-96  
'59. (MIRA 12:11)

(Kohltla-J<sub>4</sub>rve--Oil shales)

BRYZGALOVA, Ye.V.; NATAROV, V.F.

Effectiveness of manufacturing chemical products from shale tars.  
Khim. i tekh. gor. slan. i prod. ikh perer. no.8:31-50 '60.  
(MIRA 15:2)

(Oil shales)

(Chemicals industry)